

ABSTRACT

Devices and methods are described for establishing an effective annular seal about between an active pressure differential device and a surrounding wellbore sidewall. In other aspects, the invention provides a means of selectively activating such a seal during drilling operations or other operations wherein drilling mud is flowed through the drill string and returns through the annulus. The annular seal assembly may include an inflatable packer element and a hydraulic inflation system. The hydraulic inflation system uses the fluid pressure provided by drilling mud that is returning to the surface via the annulus to inflate the packer element and set the seal. The hydraulic inflation system also buffers and regulates the fluid pressure setting the packer element to avoid overinflation of the element. In other aspects, the seal assembly may comprise a set of mud cups that are set against the borehole sidewall using a pressure differential across the seal assembly or a spring-biased seal element.